



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,628	10/28/2003	Brian K. McMillin	LAM2P431	5622

25920 7590 05/19/2005

MARTINE PENILLA & GENCARELLA, LLP
710 LAKEWAY DRIVE
SUITE 200
SUNNYVALE, CA 94085

EXAMINER

GEISEL, KARA E

ART UNIT PAPER NUMBER

2877

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

ELC

Office Action Summary	Application No.		Applicant(s)	
	10/696,628		MCMILLIN ET AL.	
	Examiner		Art Unit	
	Kara E. Geisel		2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-20 is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☒ Claim(s) 2 and 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2877

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Rohr et al. (USPN 6,069,695).

In regards to claim 1, Rohr discloses a method for monitoring a plasma optical emission (column 1, lines 6-13) comprising collecting optical emission data from a plasma (fig. 1, CCD collects optical emission from plasma PA) through an aperture (SL) defined by moveable members (two members of the moveable slit), wherein the moveable members are capable of varying a configuration of the aperture (column 5, lines 5-10), holding the moveable members at a particular time, wherein the holding causes the aperture to maintain a fixed configuration (column 5, lines 35-45), and detecting a specific perturbation in the plasma optical emission while holding the moveable members (column 5, lines 18-21 and detected by CCD).

In regards to claim 4, the configuration of the aperture is defined by a size of one or more gaps present between the moveable members and a location of the one or more gaps present between the moveable members relative to an optical emission collection point (column 5, lines 5-18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be

Art Unit: 2877

patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaji et al. (US Pubs 2004/0045933) in view of Rohr et al. (USPN 6,069,695).

In regards to claim 1, Kaji discloses a method for monitoring a plasma optical emission (page 1, ¶ 2) comprising collecting optical emission data from a plasma (page 3, ¶ 28) through an aperture (fig. 3, 14-1 and 14-2), wherein the aperture has means capable of varying a configuration of the aperture (page 4, ¶ 39), holding the aperture at a particular time, wherein the holding causes the aperture to maintain a fixed configuration, and detecting a specific perturbation in the plasma optical emission while holding the aperture (page 7, ¶s 64-65). It is not disclosed that the aperture has moveable members for varying the configuration of the aperture. However it is disclosed that the configuration of the aperture can be varied in order to adjust the resolution of the optical emission monitor (page 4, ¶ 39).

Rohr discloses an apparatus for monitoring a plasma optical emission (column 1, lines 6-13) comprising an aperture (fig. 1, SL) defined by moveable members (two members of the moveable slit), wherein the moveable members are capable of varying a configuration of the aperture (column 5, lines 5-10). This is done in order to adjust the resolution of the optical emission monitor (column 5, lines 5-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was

Art Unit: 2877

made to use Rohr's aperture comprising moveable members in Kaji's device as an embodiment of Kaji's aperture that can be varied, and also in order to adjust the resolution of the optical emission monitor.

In regards to claim 4, the configuration of the aperture of the combined method is defined by a size of one or more gaps present between the moveable members and a location of the one or more gaps present between the moveable members relative to an optical emission collection point (Rohr column 5, lines 5-18).

In regards to claim 5, the particular time would correspond to a pre-designated time period prior to an anticipated endpoint of a plasma etching process (Kaji page 7, ¶s 63-65).

In regards to claim 6, it would be up to the user to decide how long the time period lasts.

In regards to claim 7, detecting the specific perturbation in the plasma optical emission can further include monitoring a wavelength of the plasma of the optical emission, the wavelength being associated with a material constituent of the plasma that is representative of a plasma etching process condition (Kaji page 7, ¶s 63-65).

In regards to claim 8, the members would be held for a period of time after detecting the specific perturbation in the plasma optical emission (the aperture would be held after determining the amount of resolution required, and how much light should enter the monitor, Rohr column 5, lines 5-18).

In regards to claim 9, it would be up to the user to decide how long the time period lasts.

Allowable Subject Matter

Claims 10-20 are allowed over the prior art of record.

Claims 2-3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 2, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method for monitoring a plasma optical emission wherein moveable members are confinement rings within a plasma etching chamber, in combination with the rest of the limitations of claim 2.

As to claim 10, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method for detecting an endpoint of a plasma etching process comprising holding moveable confinement rings in a fixed position upon reaching a pre-designated time prior to an anticipated endpoint time of the plasma etching process, and monitoring a plasma optical emission from a window through gaps between the moveable confinement rings, wherein the monitoring is performed while the moveable confinement rings are being held in a fixed position relative to the window, in combination with the rest of the limitations of claim 10.

As to claim 16, the prior art of record, taken alone or in combination, fails to disclose or render obvious a chamber for providing a plasma to perform an etching process comprising a plurality of confinement rings surrounding a chuck, a window providing a view of the plasma through one or more spaces defined by at least one of the plurality of confinement rings, and a confinement ring movement controller capable of setting programmable periods of time for moving the plurality of confinement rings, the confinement ring movement controller being capable of holding the plurality of confinement rings during a programmable period of time when monitoring for an endpoint condition through the window, in combination with the rest of the limitations of claim 16.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Mitrovic (US Pubs 2002/0139925), Mitrovic (US Pubs 2004/0026035), Mitrovic (US Pubs 2004/0104681), and Mettes (US Pubs 2004/0179187).

Mitrovic '925 discloses a method for monitoring a plasma optical emission comprising collecting optical emission data from a plasma through an aperture that is capable of being varied, holding the

Art Unit: 2877

aperture at a particular time, wherein holding causes the aperture to maintain a fixed configuration, and detecting a specific perturbation in the plasma optical emission while holding the aperture.

Mitrovic '035 discloses a method for monitoring a plasma optical emission comprising collecting optical emission data from a plasma through an aperture that is capable of being varied, holding the aperture at a particular time, wherein holding causes the aperture to maintain a fixed configuration, and detecting a specific perturbation in the plasma optical emission while holding the aperture.

Mitrovic '681 discloses a method for monitoring a plasma optical emission comprising collecting light from a laser introduced into a plasma chamber through an aperture that is capable of being varied, holding the aperture at a particular time, wherein holding causes the aperture to maintain a fixed configuration, and detecting a specific perturbation in the plasma optical emission while holding the aperture.

Mettes discloses a method for monitoring an after glow optical emission comprising collecting optical emission data from an after glow of a plasma through an aperture defined by moveable members, wherein the moveable members are capable of varying a configuration of the aperture, holding the moveable members at a particular time, wherein the holding causes the aperture to maintain a fixed configuration, and detecting a specific perturbation in the plasma optical emission while holding the moveable members. Furthermore, the moveable members are within a plasma etching process, and collecting data is performed using a window disposed outside of the moveable members, the window being oriented to collect optical emission data through the aperture.

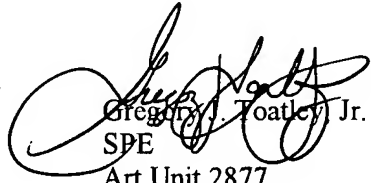
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is 571 272 2416. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

Art Unit: 2877

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571 272 2800 ext. 77. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9306 for regular communications and 703 872 9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Gregory J. Toatley, Jr.
SPE
Art Unit 2877
16 May 05

K.G.

KEG
May 11, 2005